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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,397	08/30/2001	Gurtej Singh Sandhu	303.541US2	4205
21186	7590	06/16/2004	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			TRINH, MICHAEL MANH	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 06/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/945,397

Applicant(s)

SANDHU ET AL.

Examiner

Michael Trinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 10-12, 14-20, 22-25, 27-33, 35, 109, 111-113, 115, 117, 119-121, 123-125, 128-129 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) 10-12, 14-20, 22-25, 27-33, 35, 125, 128 and 129 is/are allowed.

6) ☒ Claim(s) 109, 111-113, 115, 117, 119-121, 123 and 124 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 20040513.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

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DETAILED ACTION

*** This office action is in response to Applicant's amendment submitted on 1/22/04 and RCE filed on March 22, 04. In view of applicant's amendment and remarks, restriction of record is hereby withdrawn. Accordingly, all of claims are considered. Pending claims 10-12,14-20,22-25,27-33,35,109,11-113,115,117,119-121,123-125,128-129 are examined in this application.

*** The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

1. Claims 109,113,117,121 are rejected under 35 U.S.C. 102(b) as being anticipated by Dennison (5,206,183).

Dennison '183 teaches a method for forming a semiconductor container capacitor structure having a dielectric layer comprising at least the sequential steps of: forming a conductive container structure 28 having a closed bottom and sidewalls extending upward from the closed bottom (Figs 3,6,20; cols 4-5; col 6, line 59 through col 7); forming a dielectric cap 75 (Figs 20-21, col 7, lines 29-60) on a top of the sidewalls of the conductive container structure 28 having the dielectric cap 75, wherein the dielectric cap 75 remained on the top of the sidewalls is used as part of the dielectric layer for electrically insulating (Fig 21; col 6, lines 52-58; col 12, claim 28, lines 42-45); forming a dielectric layer 42,38 thereafter on the capacitor structure, and thus, including the dielectric cap 75 used as an electrical insulator about portions of the storage node projecting into the bit line contact openings; and forming a cell plate 44 on the dielectric layer 42,38 wherein the conductive container structure 28 comprises polysilicon, wherein the dielectric cap 75 comprises oxide.

Claim Rejections - 35 USC § 103

2. Claims 111-113,115,119-120,123-124 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Dennison (5,206,183), as applied above, and further of Lur et al (5,364,817) and Abernathey et al (4,725,560).

Dennison '183 teaches a method for forming a semiconductor device of a container capacitor as applied to claims 109,113,117,121 above.

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Dennison '183 already teaches material of the dielectric cap comprising silicon oxide; whereas, claims 111 and 119 recites silicon oxynitride, and while claims 113, 115, 121, and 124 recite selecting dielectric cap material from a group consisting of oxides, nitrides, and silicon oxynitrides. Dennison lacks annealing the dielectric cap in claims 112, 115, 120, and 123.

However, Lur et al teaches (at col 3, lines 38-56) forming a dielectric cap 28 on the sidewalls of a conductive container structure 24, wherein the dielectric cap comprises a dielectric material selected from a group consisting of oxides, nitrides, and silicon oxynitrides. Abernathey et al teach forming silicon oxynitride as a storage dielectric cap material instead of silicon oxide, and annealing the dielectric cap material of silicon oxynitride (col 5, lines 44-68; col 3, lines 16-53; cols 6-7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the dielectric cap of Dennison by alternatively using a dielectric material selected from a group consisting of oxides, nitrides, and silicon oxynitrides as further taught by Lur et al and Abernathey, because the substitution of art recognized equivalent dielectric materials would have been obvious and within the level of one having ordinary skill in the semiconductor art, wherein annealing the dielectric cap of silicon oxynitride as taught by Abernathey would have been obvious to one of ordinary skill in the art because of the desirability to form a high quality silicon oxynitride dielectric cap layer having a high breakdown voltage for storage capacitor, wherein processing steps are obviously carried out in the order as to form the conductive container structure. Additionally, it would also have been obvious to one of ordinary skill in the art at the time the invention was made to form the capacitor electrode of Dennison by employing other known alternative silicon materials selected from a group consisting of amorphous silicon, polysilicon, and hemispherical grain polysilicon, because the substitution of art recognized equivalent silicon materials for forming the capacitor electrodes would have been obvious and within the level of one having ordinary skill in the art.

Allowable Subject Matter

3. Claims 10-12, 14-20, 22, 23-25, 27-33, 35, 125, 128, 129 are allowed for reasons as already of record, in which base claims are rewritten to include all limitations of objected claims and any intervening claims.

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Response to Arguments

4. Regarding claims 10-12,14-20,22,23-25,27-33,35,125,128,129: Applicant's amendment and remarks filed on March 22, 2004 have overcome the rejections of the claims in the last office action. The claims are allowed as above.

5. Regarding claims 109,111-113,115,117,119-121,123-124, Applicant's amendment and remarks filed on March 22, 2004 have been considered, but found unconvincing and in moot in view of the new ground(s) of rejection.

As already described above, in Dennison (5,206,183), the dielectric caps 75 are formed and remained the top of the sidewalls of the conductive container structure 28. Subsequent formation of a capacitor dielectric layer and a capacitor cell polysilicon layer thereon as to form a capacitor, the remained dielectric cap 75 would thus be used as part of the capacitor cell dielectric layer (see Figs 20-21; col 7, lines 29-60 together with the teachings at Figs 3,6,8; column 4-5).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 8:30 Am to 5:00 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs-7


Michael Trinh
Primary Examiner